

Web-Based Radio Show

Visual Spatial Processing and Visual Spatial Reasoning:

How this organizes our visual world and helps us make sense of things; why visual spatial processing is so important; and why it gets under-emphasized when we work with children with or without special needs


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Good morning. This is Dr. Greenspan welcoming you to our Web-Based Radio Show. Thank you for joining us. We're starting a little bit late today because of technical difficulties. When you are using the Internet, as this innovative broadcast is doing, we find that we are always meeting new challenges and new surprises. It's good for getting your problem-solving going, and unfortunately these are not surprises that can be anticipated and prepared for. It apparently happens when you are trying to get your server working properly and getting your access to the Internet and that's one of the hazards of this new technology. The benefit is that we can broadcast to everyone at the same time who is interested in this subject. The hazards are that you are dealing with a virtual reality that has other forces operating on it that you can't always control. So anyhow, those of you who are waiting, thank you for your patience. Those who are archiving and listening to this later, you won't have had to wait. You'll just realize that those who were listening live had to wait.

Today's topic that we are going to focus on, again, is a response to some of the questions that have come in. The theme for today is one of visual spatial processing and visual spatial reasoning. I'll come back and tell you why that is so important, why it's so important in children with special needs in just a second. Also, we've gotten a number of questions about that because we often refer to them and people want to know more about it and that's what we are going to focus on as today's themes.


Also, we had a question about, from a person who is using a rapid prompting method to help kids who are nonverbal or can be verbal a little bit but only in a repetitive way, use spelling, typing, or pointing out letters to spell words in order to communicate. The question was, "Can this be used together with Floortime?" The



answer is, “Absolutely!” The key is that in Floortime, we are trying to help kids communicate what is really on their minds; what they are really thinking. We are trying to help children be more purposeful and more intentional in their communication, so instead of just repeating what someone else is saying, they are talking from the heart; they are talking from the soul. They are telling you what they are feeling and thinking. They are communicating like anyone else communicates – off your wishes, your desires, your goals, your aspirations, and your thoughts about things. So any communication method that helps a child communicate, needs to be used in this, what we call “Floortime” or “DIR Floortime” mode. So, whether it’s rapid prompting or forms of augmentative communication using computer-assisted communication, if it helps the child communicate, the key is how you then use it. The important point is not to use it in a scripted way or a memory-based way, but to use it to speak from the heart and to speak about what you really want to say. All the methods that facilitate communication, from augmentation to rapid prompting, is very, very helpful. There are always concerns that people have with different kinds of augmentative systems, particularly those that help stabilize a child’s arm at the elbow or the wrist, that you are actually controlling the child’s movements and it is the parent or the clinician whose thoughts are being represented and not the child’s. But here, there are a lot of methods now which just help a child stabilize their arm at the elbow or shoulder, where the child is freely expressing what they want to, but their hands do a little better job than their tongues, therefore they can communicate more effectively through their hands than their tongues.


Anyway, what I want to do now is move on to our main topic for today, which is visual spatial processing and thinking, and first explain why that is so important. Serena Wieder, my dear colleague, who has just completed a chapter for a new work we have just completed, our *ICDL Diagnostic Manual for Infancy and Early Childhood Mental Health and Developmental Learning Disorders*. She is going to talk with us about the visual spatial world and also emphasize why it is so important, but how parents and clinicians can observe the child in visual spatial thinking, the different components of it, and how you can exercise or strengthen it.

First, as a way of an introduction, why is visual spatial processing so important and why does it get under-emphasized when we work with children with special needs or children with learning challenges, or even with children without challenges? The answer is simple. Language has a much longer history and it’s more self-evident to us.



We know we need language to communicate. There has been a large group of professionals – speech pathologists, linguists, and others – who have studied language over many, many, many decades. Visual spatial thinking, particularly the conceptual aspects of visual spatial thinking, is an outgrowth of Piaget’s work, and two pioneers, Hans Firth and Harry Wachs. Hans Firth was a professor at Catholic University here in Washington. He has passed away. Harry Wachs, who is his colleague and co-author in the well-known book, *Thinking Goes To School*, about visual spatial thinking, runs a clinic, The Visual Conceptual Development Center here in Washington, D.C. Both worked with Piaget in the middle of the century, and then collaborated on contending Piaget’s theory into the visual spatial area, not just the symbolic area more generally. What we have learned is, children with special needs, very considerably, just like you’re doing on language capacities on visual spatial capacities, sometimes the visual spatial capacities are viewed as being more right brain oriented than left brain oriented, but the fact is that both sides of the brain are important for both language and visual spatial capacities. There is an emphasis, I think, for the visual spatial on the right side and the language more on the left side. Both involve a lot of involvement in the frontal lobes.

The visual spatial capacities, though, are what we use to make sense of what we see. That also helps us organize and put into a larger logical framework, what we hear and what we say. So the visual spatial world is important for two reasons. One, it organizes our visual world and helps us make sense of things, how do objects operate in relationship to our bodies, for example, how a pattern is formed so we can do, eventually, mathematics, even an essay requires understanding patterns and sequencing, which is part of visual spatial thinking. So it gives order to our words as well as to what we see. There are a number of different aspects of visual spatial thinking. Without it, and children who have “non-verbal learning disabilities” or other deficits in their visual spatial thinking, often have problems with sequencing problems with organizing, problems with what is sometimes called “executive functioning,” but many have problems with math and science, but also have problems with English, like writing a coherent essay. Thinking, often, will be very fragmented if we don’t strengthen the visual spatial capacities. So it gives order and organization to our inner world, and it helps us organize what we see and how we use our bodies in relationship to the external world of objects. It’s very, very important and we can see how children with special needs often have difficulties. They may invade other people’s body space, they may be involved in aimless rather than purposeful behavior with their physical environments, when they do develop some words, they may operate in a more




fragmented, piecemeal way, rather than in a logical, cohesive way. Math can be hard for some children beyond the memory – times tables or adding and subtracting facts, in terms of understanding the concept of the area under a line in a graph, for example. So all of these abilities depend on visual spatial thinking.

What I want to do now is turn it over to Serena, who is going to present a framework for thinking about the visual spatial world, and visual spatial thinking – the different dimensions of it – how it starts off with understanding one’s relationship to one’s own body, and then the world of objects outside one’s body, and then the relationships between objects in one’s self, and eventually to higher levels of visual spatial thinking involved in things like one-to-one correspondence and conservation, and higher levels of visual spatial symbolic reasoning. Serena will walk you through these different dimensions of it, but equally more importantly, or even more importantly, pulling out how easy it is to observe these capacities, so parents and clinicians can see when it’s cooking well and when it’s not cooking so well. And, most importantly, what kind of games or exercises are fun to do to strengthen these capacities, just like we have Floortime approach to language, where we practice language through interacting and playing, we can also do the same thing for strengthening visual spatial capacities, for example, treasure hunt games are great ways of doing it. Or, just simply playing catch with a ball, but throwing it in different directions so the child has to anticipate where the ball is going.

Let me now turn it over to Serena to give us a broader framework, and to begin elaborating on some of these things you can observe, and some of the exercising games you can play, and I’ll join in as well. Serena, do you want take over?

SW: Yes, good morning, everyone. This is a very, very important topic, just as we heard. It’s the one that is often so automatic because vision is so much the first avenue of learning. The first thing we do coming in to the world is kind of look around and see things, but understanding what we see is really the crucial focus today. I do want to point out, things we talk about do not pertain to the eyesight of the child. Children usually have good eyesight and this needs to be checked, of course. But really, it’s how they understand space and where they are in space and how they use space to kind of function is going to be what we want to look at. There are so many things; you just heard a few examples that involve visual spatial capacities that you take automatically. The child who drops something and doesn’t even notice or pick it up, the child who can’t find where anything is, the child who bumps into his friend without even




realizing or knocks over the glass of juice if he is reaching for the cookie – this has an enormous impact through all of our day-to-day functioning. It really pertains not only to children with special needs, but really all of us. I think maybe as we reflect on these different steps, it will be interesting to try to locate yourself in this scheme and how you have been able to use your capacities.

We broke this down and this was with the help of Harry Wachs, who really henceforth formulated a lot of this early on, more than 20 years ago, to six basic capacities. All of these are going on at the same time, developmentally. I think I also wanted to stress before going on, that these are developmental. These are not things that we teach children or just give them to practice, per se, but they have to kind of evolve developmentally in a simultaneous fashion. To be able to play ball, you have to both be aware of your body in space, you have to be aware of the location of the space around you and your relationship to what you want to do, and it's happening all at the same time.

I'm going to go through how we develop these capacities in a more step-by-step using the framework we now have of six different aspects.


Where does it start? Well, it really starts with the infant who discovers their body. Body awareness of where you are in space, or just body awareness of your own parts of yourself, really begins for that newborn, really it happens at birth when the baby begins to find their little hand and puts it into their mouth and suddenly they begin to notice that, "Oh, I can do this again and I can do this again." Locating the mouth, which of course, is the most important organ at the moment of both survival and staying alive and being nursed or fed, is very crucial. That little hand will do this reflexively, if you put your finger in, it will grip that finger. Suddenly this baby is getting the kind of input they need to know, "Oh, this is my hand." Before you know it, they can reach out and touch their other hand. So in the first year of life as the baby becomes more and more capable of purposeful movement just nortorically, in terms of their motor development, they also become more and more aware of their own body. They can touch something, they might touch the side of the crib, or they can hold the rattle, or they can touch mommy's hair as they are stroking her while she nurses them, or they notice they can have two hands because suddenly they are putting one thing in one hand to another hand. All these little experiences, countless of them for each single day, the baby is beginning to form a mental map of their body. They are beginning to move and roll and crawl and get up on all fours and creep – this helps them become



aware that, “This is my body, I can do things with it.” Really very much by the first year of life, most children know their body parts and can use them. Many, of course, are even up on their feet and now capable of coordinating their movements.

We do know that some babies don’t develop this body awareness. They are not sure of what their hands can do. Often, with children with special needs, we see the child reaching for the parent’s hand to do something, and not their own. They don’t have their own awareness that their hands can come to midline, that they can hold and turn something. Somewhere along the line, they know that their parent’s hands can do it better and they have not gotten the kind of practice and the use of their own hands as an extension of their bodies that can do things. It’s not unusual to see that kind of child with those difficulties use their parent’s hands. We have to work really hard to kind of bring things back and do a lot of hand games and do some pat-a-cake and kind of clap and start to see where we can create little problems for the child will need to use their two hands in space at once. It could be by just lifting off the top of the container to get some toys they want. It could be pulling on a string or bow to open up the package they want. You want to first notice, is the child using their two hands? This is automatic. Are they bringing them together to midline? This becomes a real foundation for later on when you have to cross midline in order to do things like writing. When you write, you have to go across the center of your body and come back again. But, even just the manipulation of toys, you’ll often see if a child isn’t using both hands at once to either stabilize the toy or to put things back-and-forth, they are still not fully aware of their bodies and might need a lot more kind of experience to help this develop further so they can do things more independently. It’s quite remarkable in not only how much occurs the first year, but the awareness the body continues well into the second year. And at this point, the child is able, if they do have good body awareness, become aware of someone else’s body. This is where we see children learning to imitate.


Imitating is crucial, but if you watch someone touch their head or jump or even clap hands, you can see someone else doing it, but if you don’t know where those same body parts are in yourself, it is going to be really hard to imitate. We see many children who have had to watch and are interested and like to be entertained, but have great difficulties, actually, with the sequencing of those actions and being able to imitate. It is a combination of what we call, “motor planning” – what do I do first? What do I do next? What do I do after that? And, being able to watch someone else do it and copy them. Here too, a child who has difficulties being able to imitate, really has a much



harder time learning. Often you'll see, with special needs children, parents are always doing hand-over-hand kinds of support because that child doesn't know where to place their hand or doesn't know what direction to turn the object or won't turn the shape sorter up-side-down. Often the same children will seek their parents hands to do the very simple tasks. Until you see your child struggling to do this, it is really hard to appreciate how undeveloped that body awareness is. A lot of these experiences really just come from day-to-day interactions. What do we see an 18-month old doing? They are rolling a ball back-and-forth and they know who to roll it to. They have a sense of the direction to go in. Or, they can play peek-a-boo and pull the scarf off daddy's or mommy's head and then pull it off their head, and they are beginning to understand who's body is involved in these different actions. We certainly see toddlers very capable of using their bodies to communicate. When they are really distressed and having a tantrum where they can't find other ways to convey what they want, their whole bodies go into action, whether they cry or fall on the floor or throw things, they now know that their body can be used to communicate, to get someone to give them what they want. When it's being used for play, it might be a little more productive, but the child who is already that distressed and has to go into this whole body action, really is not able – things break down. He is not able, at that point, to organize their body, organize their hand pointing to what they want, really conveying in a more effective way what they need.

But, children by year two, by the time they turn two, have a lot of ability to act upon the world. They can stack blocks, they can do the ring sorters, I mentioned throwing the ball, and can actually discover the magic of scribbling with chalk or a marker. It is very global, they just suddenly know that if I pick this up and move it, my hand will be able to use this object to make these beautiful colors and pictures, and of course everybody raves. Again, the child who has difficulty knowing what their hands can do might not do that action, and may not be able to pick up the block and know where to put it, or hold something down in order to open the box, like a jack-in-the-box, such a beloved toy.


So this really continues into the next year. This is where we begin to see the child's awareness of their body in relationship more to other people. The boundary between "this is me" and "this is you." And, being able to take that into account so they don't bump into someone as they are trying to move over to the blocks and pick something up because they know that "hey, there's someone in front of me and I'm



going to have to move around them if I want to reach for the block.” Often there are other ways we often see this dilemma is the child who can’t stay in line. One of the things you’ll see in many, many nursery schools between 2 and 3 year olds in the classrooms, they’ll have little footsteps on the floor. They are really trying to encourage the children to stay in their own place. So, when you ask them to get in line, they know where the line stops and starts and where they are in the middle of it, and you’ll see children walking and some children will have three feet distance, and others will be bumping into the person in front of them. So, this again, involves awareness of body and awareness of others.

The child who lacks some awareness of his body in space at this time, has a hard time with depth perception often as well. This is where we see children who still don’t walk up steps with alternating feet. They can’t quite figure out where their feet are in relationship to the stairs. So it’s not just in relationship to another person. Or, they don’t realize that they do something and make something else drop to the floor, they don’t turn around to see what happened, because they really don’t notice that it was their body doing it. These are, of course, really irritating things and I know everyone gets kind of, “Pick it up! Why didn’t you see that? What happened?” Often these are the kind of tensions that build up throughout the day as the children who aren’t well coordinated and aware are always running into these little troubles and problems. Once you realize what it is, we can take some measures and kind of support this development.

Many of you who have older children know this doesn’t resolve, necessarily, automatically. It really is a developmental process and if there is difficulty, we can kind of compensate, we can have those little mats kids sit on in circles, so they know where their space is and where to locate themselves, we can have the footsteps on the floor, we can do a lot of climbing, running, and jumping to get the kind of input you need to know where your body is, with lots of joint compression. But, it does take a lot of sensory motor activity. As many of you have probably heard on this program before, know that we stress a great deal how important it is to spend a couple of hours a day with a young child, working on these sensory motor actions, really getting out to the park or into your backyard or having the room in the basement where you can get more of this experience just through practice and playing, and of course it’s the most fun in terms of interacting. Children can enjoy this and this is not just being done for the fun,




but we know this lays the foundation piece for later learning and functioning as Dr. Stanley Greenspan mentioned earlier in the program.

So we keep building this body awareness as we move forward. Let me just describe a 3-year-old. By the time a child between 3 and 4, they really now are not only avoiding, but begin to actually find solutions. So, if their friend wants to come over, they can move over and make room for that friend to sit down. They can start playing things like tag, and keep track of where they are and keep track of where their friend is running and then be able to anticipate where that friend will be if they want to get them a few seconds later by the time they cross that distance. To begin to use their body as a whole, because now they know, “My hand has to do this, my foot has to do that.” If you want to ride a scooter, tricycle, or a bike, certainly, you have to know that you have to use your different parts of your body in different ways. Many children begin to master this by the time they are four years old.

Another very simple thing you often see, just ask a child and see if they can hop on one foot. Again, to know that if it’s only one foot that’s going to jump up and down, you have to balance the rest of your body. You see their hands go out and you see the body shaking, and then they find that right position against gravity and then they can do that.

So this capacity does develop around three and four. It’s really important. If you don’t know how to ride the scooter, you may also not know that if you don’t stop, you’ll crash into somebody – someone else’s scooter or the street or a parked car or an adult. While it may be fun to bump into cars, it’s often not very adaptive to do anything that can hurt someone else. So children who don’t do this, it’s not that they are doing it on purpose. They are not having trouble because they want to necessarily crash or fall. They really don’t yet have that coordination of their different parts of their body to be more successful at it, and they do need to practice a lot more. You have to know what one side of your body is doing to counter-balance what the other side is doing, and then you have to know what your hands and feet are doing. So when you break it down, it’s a pretty complex activity that we are asking children to do. It’s very noticeable. Most kids will catch up with practice.


Children, again, who have special needs have more difficulty of doing these kinds of things and need to do more of this kind of work every single day. I don’t think we can emphasize that enough, that if you have an understanding of what you are trying to



accomplish, there are different activities that we can make a list of and say, “These will be good things to do.” You’ll recognize if that body awareness is growing.

Just to move onto the fifth year, which is between 4 and 5, at this point, typical children can really do a very nice job coordinating not only their bodies – but where they are in space. So, now they can hop, they can skip, they can jump in different directions, now they can begin to catch a ball with two hands rather than against their body. Remember how children, typically you say, “put your hands out” and the hands don’t move? Well, that’s an earlier level, and you would expect a 3-year old to do that. But, by the time you are 4 or 5, the child is able to put their hands out, but then move their hands if they see the ball coming not right to the center of where they are located. They are able to catch the ball as well.


This is the time – kids love to walk on street edges and put one foot in front of the other. It’s also when they can now begin to take turns playing so they understand where they are and what they have to do and what the next player has to do. They can begin to play group games, not just chase the way they were doing earlier, because then you have to really track yourself and a lot of other children at the same time. Many of the children at this point begin to ride a two-wheeler, and some of them learn to skip. One of the things Harry Wachs pointed out to me that was very interesting, is that some of these activities I was just mentioning, aren’t automatic in every culture. He was telling me that, for example, in our culture children learn to skip at around age 6. Before then, they are running, or they are galloping, but that alternating is very hard. Yet Zulu children in Africa can do it at age 3. In contrast, he was telling me that in South America, some of the Indians there don’t skip at all. Or, when they jump up in the air, they don’t land on two feet. So there must be some very good historical reasons why these different patterns develop and it would be interesting to speculate. But, I think I have been able to convey how important this body awareness is. When we work with special needs children, you’ll notice that often you’ll be advised to do a lot of deep pressure and joint compression and keep providing that kind of early, basic input so the child does become aware of their different body parts. One little test I know that Harry Wachs uses, he actually had us try it, is can you locate the part of your body that is being touched when you are not looking? You might have your child lie down on the floor and see if you touch one leg, can they lift the leg that you touched. Do the left side and the right side, with their arm, with their head, and so forth. Then try to do two parts and



see if they can identify that. The challenge really comes when you do right hand and left foot. See if they can sustain the awareness to figure out the two different parts.


Often, I think, people talk about body mapping and body awareness, and if you have your child you'll notice that they do a lot of this kind of activity and this is what we mean by that. You need to have an internal and endogenous image of your body in space and then take the input from the world around you, and respond to it effectively.

SG: Let me just add a note, Serena, as you are talking. The examples Serena is giving, in terms of the DIR Floortime approach to body awareness and visual spatial processing, we emphasize one particular component of this process that these DIR Floortime occupational therapists and Harry Wachs is now doing and others are now doing. This is, the more these games and activities are done in the Floortime mode, in other words, off the child's natural interests, even when you create the game or the problem to be solved but you harness the child's motivation, which means you harness the child's affect. Let's say you are having the child play a game where he is using both hands together like clapping them together or catching a ball together, or a game where he has to identify or move the leg and arm you are touching simultaneously. That can be done in a kind of rote way where it is an exercise and the child is doing it to comply, and there isn't that much internal affect or internal motivation or internal desire associated with it. But now, if the child is using both hands together to, as Serena was saying, to open the bottle they want because you're playing dumb, "Oh, I can't open it, I need help, can you help me open this?" The child is struggling to open it and they use both hands together to turn that little top on the bottle and open it, the child is now connecting using both hands together, crossing the midline, with internal affect and internal emotion and internal desire and a sense of satisfaction. So, what that does, is it is hooking up the affect system with the emerging visual spatial body awareness system. That is how you truly get a sense of your body that is inside your sense – that is how you form a mental picture of your body in true awareness. In other words, you have to have the affect to develop the awareness. If you use just the memory and you just sort of see it and let's say you were showing a child the body through pictures and he was labeling left and right and pointing to the left hand and the right hand, and then even doing it on their own body to some degree, he could do that in a memory way, but wouldn't have true internal sense of awareness. He wouldn't have that feel for his body. If adults just close their eyes for a second and feel their bodies, and then feel the different parts moving, they can see that it is an affective experience. In fact, one of the first ways in



which affect gets used by the baby, even before the baby is born, in utero, is in terms of connecting affect to proprioceptive feedback through the sensory system. So, when we move, we experience some sensation in our bodies. We don't just look at our hands moving and say, "oh, it's moving." There's a sensation in the body of the hand moving. That sensation is affective in nature. It is an emotional reaction. It may be bland, it may be indifferent, it may be exciting where we have a perfect tennis shot or we have a perfect golf shot or we dance the perfect dance step. It may be associated with drawing. The more pleasurable affects that we can harness, and sense of mastery and excitement to invest that proprioceptive feedback loop, the more this sense of self that involves awareness of the body emerges. So, it's not just self of thoughts or self of ideas or a self of objects you see in space, but it's a sense of self that starts at it's foundation with the awareness of one's own body.

So, the first awareness is the awareness of one's own sensations, own movements. A little baby is moving her little arms and legs in mommy's tummy, that sensation is beginning to occur inside the nervous system of that baby, particularly in the third trimester when much of the central nervous system has not been fully formed, because much of it gets formed when the baby is born. But, a number of the tracts are already formed. Then in the first three or four years of life, when $\frac{3}{4}$ of the brain is getting formed, at these tracts – the connections to be formed, when you do the kinds of activities Serena was talking about, but when you do it with a lot of affect-driven activities – with the child's pleasure, with the child's initiative, is harnessed, you are getting now the integration of affect with the awareness of sensation. So now it is a sensory affect motor connection. The initial sensory is proprioceptive. Later on it becomes the sensation of different sights and sounds and patterns that the baby is aware of and eventually words and concepts. When we see that some babies who are at risk of special needs have difficulty early in life, for example, with the very earliest types of forerunners of imitation: rhythmic activity, hard for them to get in rhythm with their mommy's movements or their mommy's voice or daddy's movements or daddy's voice, where other babies we see nice rhythmic interaction and nice synchrony of movement as mommy and daddy are moving their faces and smiling and the baby is smiling back in rhythm. Well, some babies have a harder time just because of the way their nervous system is wired. We find that doing more of these kinds of rhythmic interactive activities and getting that pleasurable emotion going in the very first stages of infancy can be very, very helpful. But, it can also be helpful for a 4-year old or 5-year




old who isn't yet fully engaged and doesn't yet have the awareness of their body that Serena is talking about.

The way we recommend doing these little games and exercises, is off the child's natural interests. Or, we create games or problems to be solved, as Serena likes to describe it, where the baby's natural interests and affects are harnessed so that this sense-awareness, awareness of your body is connected to the pleasure of the activity and then it really works. So, I just wanted to emphasize that, which is implicit in everything you said.

SW: Yes, no, absolutely. I would again point out that generally if we can create an environment and woo children into this, this is exactly what they want to do. They can really enjoy this and that interaction is really crucial to keeping this going. For some children this is really hard work and it takes a lot of practice to do. The affect also sustains the kind of effort they have to do to keep it going. Just think of how typically even just wooing children and applauding their accomplishments and getting them to take some risks so they can practice and ride that little bike - we're using affect all the time. But, I find of all the areas, this is the one children will move towards most naturally, because it is coming from inside-out. When they don't know how to start off, I think by talking them into it, we just have to be sure children are offered the environments that will encourage them to take that lead and take that initiative.

SG: One of the things Serena and I have been very interested in, and we've talked about at other times, is children with Cerebral Palsy who have severe motor problems, there are different ways to work with the children. There is a long tradition in this country, stemming from the neurodevelopmental approaches to help children learn to use their muscles. There is also a tradition that has emerged in Eastern Europe where environments are set up where the children are naturally motivated to use their bodies in very creative ways. There are individuals who are trained in this method. I think this is a very helpful concept, though, for all children, not just children with severe motor problems. Children with all special needs conditions, because most have motor planning and sequencing problems, create the environments where it's not just a physical environment as they do in Eastern Europe, but actually where the physical environment and the caregiver can work together, but where the environment is set up so it makes it easier for the caregiver to harness the child's natural interest and the child wants to climb up those steps, wants to reach for that object that is just a little bit out of reach. So, you have exciting objects a little out of reach, you have little steps they can




climb on, you have environments where they need to use the left and right sides of their bodies together and the caregiver can then be the mediator. So, it's like the motivating factors are already intrinsic in the environment and this can be very, very helpful for children learning to navigate the very, very steps that Serena is talking about.

Serena, we only have a few more minutes today because we started late, but I wanted to ask you if you would identify the other areas, just briefly, so people see the framework, that have to do with visual spatial processing and reasoning. We'll get to these in future shows, because I think what I'm aware of is we talked about this first important and probably foundation-building piece, the body awareness, today. We may only cover one or two components of these main components each show, but I think it's worth spending time on this because we spent time on many of the other critical elements for children with special needs and learning challenges, and I think focusing in on the visual spatial world and spending a few shows on it, will be very helpful. You've done a gorgeous job in walking through this first one. Could you just outline...

SW: Let me do this, because I do think this will warrant a lot more time. I just might mention that the method you were referring to was Conductive Education, and I want to mention another method, which I think is not as familiar to people in this country. It's called MEDEK, which builds totally on this concept of building the body awareness through movement.

SG: Could you comment on how that differs or is similar to Conductive Education?


SW: Well, it's a little different. It's more of a therapeutic technique that works with children moving in space using – I don't want to oversimplify it – but this one encounters space. It uses very creative things just like boxes, but really encountering space and then kind of figuring out how to move into it, or out of it, or around it. So, it's a more focused technique, but I have seen it very useful for not only children with CP, but for children who just don't have this awareness. They are plowing through space and they don't realize they are stepping on something. Or, they hit an encounter and they can't do the problem solving like to climb up or walk around it. So, it takes into account body awareness in a very focused way, and I have seen some nice results from that. Conductive Education is a little different, but I think what they do, which is quite creative, and I actually went to see how they work because I was so fascinated about how they get that motivation, this is a method that was developed after WWII in Europe



where they didn't have a lot of adaptation for people with handicaps or they didn't have a lot of wheelchairs and so forth. So, so to create a sense of body awareness and movement they would build platforms that would have a little flap for the infant – even the most spastic infant could grip it, because they would naturally grip from the human reflex, and they would sense that they could pull or push their body forward. Or they would use little ladder-back chairs and, again, would have something the child could grip, and then be able to stabilize or stand or even move the chair.

Different methods have come to us from all over the world that, I guess, have evolved because of need and necessity and people have tried to build this awareness and they are really useful.

But, let me go over quickly the other areas we can cover in our future shows. Again, as I said, these are parallel with body awareness. One would be the location of your body in space. You have to know not only where your different body parts are on your own body and this body mapping kind of way, but the location of your whole body in your surroundings. You have to know where you are in the room or in the park or the broader environment, and how movement helps you locate yourself. The third area we'll talk about are the relationship of objects to yourself and objects to things to people and how we move in relationship and interactions with other people and using different things and begin to use symbols and follow rules. It's using yourself in relationship to others, which is very important. The fourth thing we'll talk about is more cognitively focused, which is the conservation of space, that you might know you might move, but the space doesn't move around you. If you turn around, it doesn't mean the world has turned around as well. This is just a very simple example of how children begin to learn to deal with three dimensional space and their location in space – what changes and what doesn't change. The fifth area we'll cover will be logical thinking – visual logical thinking – this is non-verbal thinking. This has a lot to do in very simple ways, things like cause and effect – the child pushes a little button and something pops up, like a pop-up toy, to really doing more complex things in terms of building and construction and being able to see the reverse side of something, so depending on how you do that pattern, if you not only have to do a straight line, but if you had to go backwards and forwards and upright. We'll give a lot of examples because visual logical reasoning is so important later for academic thought. Last, we'll cover what we call representational thought. How do you represent space? Whether it's in drawing or in thinking or visualizing, and this kind of representation is really, really important for



imaginative play and then later being able to use drawing or figure space out for geometry problems in order to do higher level problems and tasks.

So, it's been a wonderful opportunity to really think of the year by year progression of this, and we'll be able to share that with you.

SG: Thank you, Serena. Next week we will not have a show. We'll resume in two weeks with both Serena and myself. We'll pick up where we left off and go into these additional aspects of visual spatial thinking and processing and try to present a more complete picture, so to speak, of how this visual spatial world forms. Particularly, as Serena has so beautifully done today, give ideas about ways of helping children who are not learning these capacities naturally, often because of biological challenges, to have the extra practice they need to develop these capacities. What we find is, even children with severe visual deficits can learn visual spatial thinking by using their other senses, and even children who find it hard because they don't move parts of their body in synchrony easily can learn these skills and learn to form these inner capacities if we practice them in the right way. It may take a longer time and a lot of extra practice, but the key thing is knowing these building blocks which now we are identifying better than ever before. So, Serena, I look forward to talking more about this. Thank you again. We'll see you all in two weeks. Next we will not have a show, but we hope to hear from you in two weeks, and next week hopefully you can use that time to listen to one of the archived shows. Thank you all very much.

SW: Bye, bye every one.

SG: Bye, Serena.

SW: Bye.